AF

IN THE UNITED STATES
PATENT AND TRADEMARK OFFICE

Patent Application

Inventors(s):	George Earl Peterson	**Case:**	18
Serial No.:	09/915,963	**Filing Date:**	July 26, 2001
Examiner:	Shih Chao Chen	**Group Art Unit:**	2821
Title:	Broadband Polling Structure		

THE COMMISSIONER OF PATENTS AND TRADEMARKS
WASHINGTON, DC 20231
SIR:

Enclosed is an **Appeal Brief** (in triplicate) in the above-identified application.

The appeal brief fee of **$500**, as required by 37 CFR §1.17(c), may be charged to my **VISA** (Form 2038 attached).

In the event of any non-payment or improper payment of a required fee, the Commissioner is authorized to charge or to credit my **VISA** as required to correct the error.

Respectfully,

Michael J. Urbano
Attorney for Applicant(s)
Reg. No. 24, 522
610-691-7710

Date: 03/31/07

Express Mail No. EL 989 174 044 US

Date of Deposit 03/31/07

I hereby certify that this amendment is being deposited with the U.S. Postal Service "Express Mail Post Office to Addressee" service under 37CFR1.10 on the date indicated above and is addressed to the Commissioner of Patents and Trademarks, Washington, DC.

Michael J. Urbano:

OIPE IAP28
MAR 3 1 2007
PATENT & TRADEMARK OFFICE

IN THE UNITED STATES
PATENT AND TRADEMARK OFFICE

Patent Application

Inventors(s):	George Earl Peterson	**Case:**	18
Serial No.:	09/915,963	**Filing Date:**	July 26, 2001
Examiner:	Shih Chao Chen	**Group Art Unit:**	2821
Title:	Broadband Polling Structure		

THE COMMISSIONER OF PATENTS AND TRADEMARKS
WASHINGTON, DC 20231
SIR:

APPEAL BRIEF UNDER 37 CFR § 1.192

I. Real Party In Interest

The real party in interest is Lucent Technologies Inc., 600 Mountain Avenue, PO Box 636, Murray Hill, NJ, 07974-0636.

II. Related Appeals and Interferences

There are no related interferences.

There is a related appeal. More specifically, Appeal No. 2005-2760 addressed Section 112, 102 and 103 issues of *original* claims 1-3, 5-13, 15-19, 21 and 23-25 in the instant application.

Original dependent Claim 20, which had been allowed and was not therefore considered in the Board's decision, now stands rejected under Section 103.

Subsequent to the Board's decision independent Claims 1, 11 and 21 were amended to incorporate the fast wave limitations of original Claims 2 and 12. Accordingly, Claims 2 and 12 were canceled.

III. Status of the Claims

Claims Extant: Claims 1, 3-11 and 13-25 are now in this case.

04/05/2007 LWONDIH1 00000029 09915963 500.00 OP
01 FC:1402

Claims Rejected: Claims 1, 5-11, 15-21 and 23-25 stand finally rejected. More specifically, these claims have been rejected under 35 USC §103(a) as being unpatentable over Wicks *et al.*, US Statutory Invention Registration No. H2016H published on April 2, 2002 (hereinafter *Wicks*); in view of Ogot *et al.*, US Patent No. 5,648,787 issued on January 15, 1997 (hereinafter *Ogot*); and further in view of J. D. Kraus, "Antennas," 2nd Ed., McGraw Hill, NY (1988), pp. 759-760 (hereinafter *Kraus*)..

Claims Allowable: Claims 3, 4, 13, 14, and 22 have been objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in dependent form including all of the limitations of the base claim and any intervening claims.

Claims on Appeal: Claims 1, 5-11, 15-21 and 23-25 are on appeal.

IV. Status of Amendments

No amendments were filed subsequent to the final Office action dated November 7, 2006.

V. Summary of the Invention

Applicant's antenna structure [100, FIG. 2(a); 200, FIGs. 4(a) and 4(b)] operates over a wide frequency spectrum and offers wider directivity than prior art *endfire*-type devices (10, FIG. 1), which makes the invention better suited to polling applications (page 7, lines 1-5; page 9, lines 24 *et seq.*). Applicant recognized that the narrow directivity of tapered slot antennas is attributable to the phase velocity supported by the antenna's dielectric substrate (page 2, lines 18-20). In particular, *Applicant's antenna structure supports a phase velocity greater than the speed of light* (page 2, lines 21-22; page 7, lines 9-10; FIG. 2)

More specifically, Applicant's antenna structure comprises at least one tapered antenna element [110, FIGs. 2(a) and 2(b); FIG. 3; 210 and 215, FIGs. 4(a) and 4(b)] coupled with a symmetrically shaped finite ground plane [page 2, lines 23-24; 125, FIGs. 2(a) and 2(b); 225, FIG. 4(a)], which supports the relatively wider directivity of the broadband structure (page 7, lines 22-23; page 10, lines 6-7). In addition, the at least one antenna element comprises a *traveling wave antenna supporting a phase velocity greater*

than the speed of light, as set forth in independent Claim 1, lines 8-9, independent Claim 11, lines 11-12, and independent Claim 21, lines 20-21. This type of antenna element is referred to as a *fast wave* element (Page 10, lines 23-24).

In one important embodiment (FIG. 4), a fast wave tapered antenna element (210, 215) is combined with a slow wave antenna element (220) to widen the directivity of the antenna structure and thereby insure greater coverage for polling and/or scanning a three-dimensional space (Page 11, lines 12-21), as set forth in dependent Claim 20.

VI. Issues Presented for Review

Issue A: The impact of the Board's decision in Appeal No. 2005-2760.

Issue B: Whether Claims 1, 5-11, 15-21 and 23-25 are patentable over Wicks in view of Ogot and Kraus under 35 USC §103(a).

VII. Grouping of Claims

Claims 1 and 5-10 are in a first group.

Claims 11 and 15-20 are in a second group.

Claims 21 and 23-25 are in a third group.

In each of the groups the claims do *not* stand or fall together. As indicated in Section VIII, Argument, *infra*, the claims of each of the groups are believed to be separately patentable.

VIII. Argument

Issue A: In its decision of October 27, 2005 in Appeal No. 2005-2760 the Board held as follows:

(1) **Claims 1, 3, 5-9, 11, 13 and 15-18:** It *reversed* the Section 102(e) rejection of original Claims 1, 3, 5-9, 11, 13 and 15-18.

(2) **Claims 2 and 12:** It *reversed* the Section 112 rejection of appealed, original dependent Claims 2 and 12, which required that the at least one tapered antenna element comprise a traveling wave antenna supporting a phase velocity greater than the speed of light. Subsequent to the Board's decision, in

Applicant's response of November 28, 2005, this feature was added to independent Claims 1, 11 and 21. Accordingly, original Claims 2 and 12 were canceled. At the time Claims 2 and 12 had not been rejected based on prior art under either Section 102 or Section 103.

(3) **Claims 10, 19, 21 and 23-25:** It *sustained* the Section 103 rejection of appealed original Claims 10, 19, 21 and 23-25.

(4) **Claims 1, 3, 5-9, 11, 13 and 15-18:** It *stated* that Ogot provides for the deficiencies of Wicks regarding the Section 102(e) rejection of appealed original Claims 1, 3, 5-9, 11, 13 and 15-18, but noted that no Section 103 rejection was before them regarding these claims.

(5) **Claims 1 and 11:** It *made a new Section 103 rejection* of appealed, independent original Claims 1 and 11.

(6) **Claims 3, 5-9, 13 and 15-18:** It *made* "no representations or new grounds of rejection regarding [appealed] original Claims 3, 5-9, 13 and 15-18. We leave those claims for the examiner to revisit if the examiner deems it advisable..."

(7) **Claim 20:** It *made no comment* on original dependent Claim 20, which was at the time allowable and hence not on appeal.

In terms of prior art, the Board considered only Wicks under Section 102 and the Wicks/Ogot combination under Section 103. As discussed hereinafter, the Examiner has since combined Wicks/Ogot with a third reference by Kraus to formulate a new Section 103 rejection of Claims 1, 5-11, 15-21 and 23-25.

Kraus was actually before the Board, but only because Applicant cited it, among other references, to traverse the Examiner's Section 112 rejection of original Claims 2 and 12; that is, to establish that a phase velocity greater than the speed of light did not violate any fundamental laws of physics. The Board agreed.

As indicated above, the limitations of original Claims 2 and 12 have been incorporated into amended independent Claims 1, 11 and 21.

Thus, *for the first time* the Board is being asked to review the Examiner's Section 103 rejection of Claims 1, 5-11, 15-19, 21 and 23-25 based on a *new* combination of

references: Wicks, Ogot and Kraus instead of the previous combination of only Wicks and Ogot, notwithstanding that all three references have been before the Examiner since Applicant cited Kraus of July 11, 2002.

In addition, *for the first time* the Board is being asked to review the Examiner's Section 103 rejection of dependent Claim 20 based on the Wicks/Ogot/Kraus combination.

Issue B: In Section 2 of the final Office action dated November 7, 2006, Claims 1, 5-11, 15-21 and 23-25 were rejected under 35 USC 103(a) as being obvious over Wicks in view of Ogot and further in view of Kraus.

Section 2, pages 2-4, repeat the Examiner's position regarding the combination of Wicks and Ogot. In the last paragraph on page 4, the Examiner makes the following acknowledgement:

> Wicks et al. and Ogot et al. teach every feature of the claimed invention except for the at least one antenna element comprises a traveling wave antenna supporting a phase velocity greater than the speed of light; and a slow wave antenna to widen the directivity of the antenna structure.

However, the Examiner further argues that Kraus supplies the deficiencies of the Wicks/Ogot combination, as follows:

> Kraus teaches in figures 16-41 & 16-42 the at least one antenna element (Leaky-wave antennas) comprises a traveling wave antenna (Surface-wave antenna) *to widen the directivity of the antenna structure*. (emphasis added)
>
> In view of the above statement, it would have been obvious to one having ordinary skill in the art at the time the invention was made by using leaky-wave antenna or surface-wave antenna as taught by Kraus *in order to have the structure carries a fast wave (v>c) or a slow wave (v<c)* (See pp759-760). (emphasis added)

This rejection is respectfully traversed for the reasons set forth below:

(1) **Summary of the Invention:** It will be helpful to recall that Applicant's antenna structure , as defined by independent Claims 1, 11 and 21, requires that the "at least one antenna element comprises a traveling wave antenna supporting a phase velocity greater than the speed of light;" that is, a fast wave antenna ($v > c$). In addition, in one embodiment, as set forth in dependent Claim 20, which depends from Claim 11, Applicant's invention also requires "a slow wave antenna to widen the directivity of the antenna structure" in combination with the fast wave antenna. In a slow wave antenna $v < c$.

(2) **Improper Combination:** It is black letter law that a proper Section 103 rejection "requires some reason, suggestion, or motivation from the prior art as a whole for the person of ordinary skill to have combined or modified the references" in the manner suggested by the Examiner. [See, I. H. Donner, *Patent Prosecution*, 3rd Ed., BNA Washington, DC (2003), p. 778.] Applicant submits that the above-quoted portion of the Examiner's rejection, which is the only portion that discusses Kraus, fails to explain *why one skilled in the art would be motivated to modify* the Wicks/Ogot combination in accordance with the fast wave ($v > c$) traveling wave design of Kraus. Without a clear indication of such motivation, the Examiner's statement is merely an unsupported conclusion. It is, moreover, clearly an impermissible use of hindsight and Applicant's own teaching. For this reason alone, it is respectfully submitted that Claims 1, 11 and 21 are not obvious in view of Wicks, Ogot and Kraus. There are, however, additional reasons supporting Applicant's position of non-obviousness; to wit:

(3) **Kraus-Selection of Fast vs. Slow Wave Elements:** As the Examiner correctly points out, Kraus describes separately antenna structures that include either slow wave elements (e.g., Figure 16-41) or fast wave elements (Figure 16-42). However, Kraus fails to teach one skilled in the art why s/he should choose to include a fast wave element over a slow wave element in the Wicks/Ogot combination. An antenna structure including such a fast wave element is the essence of independent Claims 1, 11 and 21. Similarly, Kraus

fails to teach one skilled in the art why s/he should choose to include *both* a fast wave element *and* a slow wave element in the Wicks/Ogot combination. An antenna structure including both fast and slow wave elements is the essence of dependent Claims 20.

(4) **Wicks-Slow Wave TEM Propagation:** As Applicant, Dr. G. E. Peterson, has pointed out several times during the prosecution of this case, Wicks teaches away from the use of a fast wave antenna; to wit, at column 2, lines 66-67, Wicks specifically teaches that the *slot transmission line has a TEM mode of propagation.* As noted in Applicant's July 11, 2002 traversal of the Section 112 rejection in the first Office action, a TEM wave (or mode) is a *slow wave*, which means that its phase velocity is *less than* the speed of light, *not greater than* the speed of light as required by Claims 1, 11 and 21. Therefore, one skilled in the art would be deterred from applying the Kraus fast wave antenna ($v > c$) to the Wicks antenna design and thus to the Wicks/Ogot combination.

(5) **Kraus-Directivity:** The Examiner asserts that Kraus suggests the use of a "traveling wave antenna (Surface-wave antenna) *to widen the directivity of the antenna structure,*" but in fact Kraus is silent on the issue of widening directivity. In addition, Applicant's dependent Claim 20 is directed to an embodiment that widens directivity by adding a slow wave element [FIG. 4(a); element 220] to the antenna structure that already includes a fast wave element [FIG. 4(a); elements 210, 215]. As noted above, Kraus fails to suggest the use of a fast wave antenna element in the Wicks/Ogot combination. Kraus likewise fails to suggest that a slow wave antenna widens directivity. Accordingly, the Wicks/Ogot/Kraus combination likewise fails to suggest the use of *both* a fast wave element and a slow wave element in the same antenna structure.

IX. Conclusion

In summary, it is respectfully submitted that Claims 1, 5-11, 15-21 and 23-25 are not rendered obvious by the proposed combination of Wicks, Ogot and Kraus.

Accordingly, reversal of the final rejection is in order.

X. Appendix

The Claims under appeal are in Appendix A.

Respectfully,
George Earl Peterson

By_____
Michael J. Urbano
Attorney for Applicant
Reg. No. 24,522
610-691-7710

Date: 03/31/07

Att.
Appendix A

APPENDIX A

Claims on Appeal

1. An antenna structure comprising:

at least one antenna element, the at least one antenna element having at least one taper; and

a symmetrical finite ground plane coupled with the at least one antenna element;

wherein the at least one antenna element comprises a traveling wave antenna supporting a phase velocity greater than the speed of light.

5. The antenna structure of Claim **1**, wherein the at least one antenna element is positioned at an angle from the symmetrical ground plane.

6. The antenna structure of Claim **5**, wherein the angle is about 90 degrees with respect to the **x**-, **y**- and **z**- axes.

7. The antenna structure of Claim **1**, wherein the at least one antenna element is coupled with the symmetrical ground plane by means of an unbalanced impedance.

8. The antenna structure of Claim **7**, wherein the unbalanced impedance comprises a coaxial cable.

9. The antenna structure of Claim **7**, wherein a first conductor of the unbalanced impedance mechanically couples the at least one antenna element with the symmetrical ground plane.

10. The antenna structure of Claim **1**, wherein the symmetrical ground plane is disk shaped.

11. An antenna structure comprising:

an array of at least two antenna elements, each antenna element having at least one taper;

a symmetrical finite ground plane; and

an unbalanced impedance for coupling the array of at least two antenna elements with the symmetrical ground plane;

wherein at least one antenna element of the array comprises a traveling wave antenna supporting a phase velocity greater than the speed of light.

15. The antenna structure of Claim **11**, wherein each antenna element of the array is positioned at an angle from the symmetrical ground plane.

16. The antenna structure of Claim **15**, wherein the angle for each antenna element is about 90 degrees with respect to the **x**-, **y**- and **z**- axes.

17. The antenna structure of Claim **11**, wherein the unbalanced impedance comprises a coaxial cable.

18. The antenna structure of Claim 17, wherein a first conductor of the unbalanced impedance mechanically couples each antenna element of the array with the symmetrical ground plane.

19. The antenna structure of Claim **11**, wherein the symmetrical ground plane is disk shaped.

20. The antenna structure of Claim **11**, further comprising a slow wave antenna to widen the directivity of the antenna structure.

21. An apparatus comprising:

a transceiver; and

an antenna structure for radiating or capturing electromagnetic energy from or to the transceiver comprising:

at least one antenna element having at least one taper, the taper comprising a linear profile, a linear constant profile, a broken-linear profile, an exponential profile, an exponential constant profile, a tangential profile, a step-constant profile, or a parabolic profile;

a symmetrical disk shaped finite ground plane, the at least one antenna element being positioned at an angle from the symmetrical disk shaped finite ground plane; and

an unbalanced impedance for coupling the at least one antenna element with the symmetrical disk shaped finite ground plane;

wherein the at least one antenna element comprises a traveling wave antenna supporting a phase velocity greater than the speed of light.

23. The antenna structure of Claim **21**, wherein the angle is about 90 degrees with respect to the **x**-, **y**- and **z**- axes.

24. The antenna structure of Claim **21**, wherein the unbalanced impedance comprises a coaxial cable.

25. The antenna structure of Claim **21**, wherein a first conductor of the unbalanced impedance mechanically couples the at least one antenna element with the symmetrical ground plane.